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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,619	12/27/2003	Vladimir S. Moxson		7498

7590 01/19/2011  
ADVANCE MATERIALS PRODUCTS, INC.  
1890 GEORGETOWN ROAD  
HUDSON, OH 44236

EXAMINER
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ZHU, WEIPING

ART UNIT	PAPER NUMBER
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1734

MAIL DATE	DELIVERY MODE
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01/19/2011

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/748,619

**Applicant(s)**

MOXSON ET AL

**Examiner**

WEIPING ZHU

**Art Unit**

1734

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 November 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2, 3, 5-14, 17, 19 and 21 is/are pending in the application.
- 4a) Of the above claim(s) 5-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2, 3, 17, 19 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-945)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 2, 3, 17, 19 and 21 are currently under examination, wherein claim 21 has been amended in applicant's amendment filed on November 12, 2010. Claim 22 has been cancelled in the same amendment.

### ***Status of Previous Rejections***

2. The previous rejections of claims 2, 3, 17, 19 and 21 under 35 U.S.C. 103(a) as stated in the Office action dated August 13, 2010 are maintained as follows:

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 3, 17, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brupbacher et al. (US 5,059,490) in view of Gottselig et al. (US 4,961,529) and further in view of Kugler (US 4,410,412).

With respect to claim 21, Brupbacher et al. ('490) discloses a fully-dense discontinuously-reinforced titanium matrix composite material having superior physical and mechanical properties including high compressive properties, high fracture toughness and excellent creep characteristics comprising (col. 1, lines 25-43, col. 3, lines 23-58, col. 4 lines 3-50 and col. 4, line 63 to col. 5, line 8, col. 7, line 3 to col. 9, line 49):

- a. a matrix of a titanium alloy;
- b. ceramic and/or intermetallic hard particles dispersed in the matrix comprising SiC, TiC, ZrC, TaC, WC, NbC and intermetallic compounds of various metals including Al, Ti, Si, Mo, W, Nb, V, Zr, Cr, Hf, Co Ni and Fe present as desired in the matrix;
- c. complex carbide particles comprising Ti, Zr, Hf, V, Nb, Ta, Cr, Mo and W separately provided in a reaction mixture that are at least partially soluble in the matrix at the sintering or forging temperature such as TiVC dispersed in the matrix; and
- d. complex carbide-aluminide particles such as TiVC/TiAl, suggesting the claimed complex carbide-aluminide particles of  $Al_4SiC_4$ ,  $Al_4SiC_4$  or  $Al_4SiC_4$  would be formed in the presence of SiC and Al during the direct synthesis process of Brupbacher et al. ('490), wherein the ceramics and/or intermetallic hard particles dispersed in the matrix are incorporated into the titanium matrix composite during the preparation of a basic powdered blend (col. 1, lines 30-43 and Example 3)

Brupbacher et al. ('490) does not specify the presence of the complex carbide-silicide particles in the titanium matrix composite material as claimed. Gottselig et al. ('529) discloses forming  $Ti_3SiC_2$  by reacting Ti with SiC (abstract). It would have been obvious to one of ordinary skill in the art that during the direct synthesis process of Brupbacher et al. ('490), the claimed  $Ti_3SiC_2$  would be formed in the presence of SiC and Ti as evidenced by Gottselig et al. ('529) (abstract). Brupbacher et al. ('490) does

not specify the amounts of the ceramic and/or intermetallic hard particles as claimed. However, Brupbacher et al. ('490) discloses that the total ceramic whisker loadings range from less than 5 to greater than 90 volume percents (col. 4, lines 3-10), which overlaps the claimed ranges of 50% by volume or less. A prima facie case of obviousness exists. See MPEP 2144.05 I.

Brupbacher et al. ('490) in view of Gottselig et al. ('529) does not disclose the presence of the intermetallic compound of  $Al_8V_5$  in the titanium matrix composite material as claimed. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the carbides of Brupbacher et al. ('490) in view of Gottselig et al. ('529) (e.g. TiC) with the claimed  $Al_8V_5$  in the titanium matrix composite material of Brupbacher et al. ('490) in view of Gottselig et al. ('529) with an expectation of success, because the carbides and  $Al_8V_5$  are functionally equivalent in terms of being used to make solid ceramic or intermetallic cathodes as disclosed by Kugler ('412) (col. 1, lines 34-40 and Example 2). See MPEP 2144.06.

The properties of the fully-dense discontinuously-reinforced titanium matrix composite material disclosed by Brupbacher et al. ('490) appear to read on the properties as claimed in the instant claim 21. It would have been obvious to one of ordinary skill in the art that the mechanical and other properties of claimed and Brupbacher et al. ('490) in view of Gottselig et al. ('529) and further in view of Kugler ('412)'s discontinuously-reinforced titanium matrix composite materials would be similar because the similarities in compositions and processes of making between the materials.

With respect to claim 2, Brupbacher et al. ('490) discloses that the porosity in the composite material can be eliminated (col. 8, lines 1-15), which reads on the claimed discontinuous porosity at the density over 98% from the theoretical value.

With respect to claim 3, Brupbacher et al. ('490) discloses that the matrix alloy is a titanium aluminide (col. 3, lines 48-58).

With respect to claim 17, Brupbacher et al. ('490) discloses that the composite material comprises silicon carbide and graphite as whisker material (col. 1, lines 30-43) in an amount of from less than 5 to greater than 90 volume percent (col. 4, lines 3-10).

With respect to claim 19, Brupbacher et al. ('490) in view of Gottselig et al. ('529) and further in view of Kugler ('412) does not specify the amounts of the complex carbide-silicide particles and the complex carbide-aluminide particles as claimed. However, Brupbacher et al. ('490) discloses that the total ceramic whisker loadings range from less than 5 to greater than 90 volume percents (col. 4, lines 3-10), which overlaps the claimed ranges.

#### ***Response to Arguments***

4. The applicant's arguments filed on November 12, 2010 have been fully considered but they are not persuasive.

The applicant argues that 1) Gottselig et al. ('529) does not relate to titanium matrix composite in any way, the  $Ti_3SiC_2$  cannot be used for reinforcing titanium matrix composite and the claimed  $Ti_3SiC_2$  would not absolutely obviously be formed during sintering in the presence of SiC and Ti; 2) Kugler ('412) does not relate to titanium matrix composite at all, neither Brupbacher et al. ('490) nor Gottselig et al. ('529)

discloses the presence of the intermetallic compound of  $Al_8V_5$  in the titanium matrix composite material as claimed and there is no reference to complex carbides or silicides in Kugler ('412); 3) nobody can control the reactions among the components of the initial powdered blend, therefore, the instant inventors include ceramic and/or intermetallic hard particles in ready form into the basic blend to control the effect of the dispersed particles on the mechanical properties of the resulting titanium matrix composite and 4) not one of the prior art references contains all of the components of the instantly claimed titanium matrix composite. In response, the examiner notes that 1) The ground of rejection of the claimed titanium matrix composite relies on the teaching of Brupbacher et al. ('490) rather than that of Gottselig et al. ('529) and Gottselig et al. ('529) does teach the formation of  $Ti_3SiC_2$  during sintering in the presence of SiC and Ti (abstract); 2) The ground of rejection of the claimed titanium matrix composite relies on the teaching of Brupbacher et al. ('490) rather than that of Kugler ('412). Kugler ('412) does teach that the carbides of Brupbacher et al. ('490) in view of Gottselig et al. ('529) (e.g. TiC) and  $Al_8V_5$  are functionally equivalent (col. 1, lines 34-40 and Example 2), therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the carbides of Brupbacher et al. ('490) in view of Gottselig et al. ('529) (e.g. TiC) with the claimed  $Al_8V_5$  in the titanium matrix composite material of Brupbacher et al. ('490) in view of Gottselig et al. ('529) with an expectation of success. The ground of rejection of the instantly claimed complex carbides or silicides relies on the teaching of Brupbacher et al. ('490) in view of Gottselig et al. ('529) rather than that of Kugler ('412); 3) Brupbacher et al. ('490) discloses that

ceramics and/or intermetallic hard particles dispersed in the matrix are incorporated into the titanium matrix composite during the preparation of a basic powdered blend as instantly claimed (col. 1, lines 30-43 and Example 3); and 4) It is noted that the applicant is arguing against the references individually, whereas, the obvious rejection relies on the combined teachings of Brupbacher et al. ('490) in view of Gottselig et al. ('529) and further in view of Kugler ('412) as discussed above. The combination of the references with proper motivations renders the instantly claimed discontinuously-reinforced titanium matrix composite materials obvious to one of ordinary skill in the art.

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Weiping Zhu whose telephone number is 571-272-6725. The examiner can normally be reached on 8:30-16:30 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emily Le can be reached on 571-272-0903. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Weiping Zhu/  
Examiner, Art Unit 1734

/Emily M Le/  
Supervisory Patent Examiner, Art Unit 1734

1/7/2011